



# Town of Sudbury

Office of Selectmen  
[www.sudbury.ma.us](http://www.sudbury.ma.us)

Flynn Building  
278 Old Sudbury Rd  
Sudbury, MA 01776-1843  
978-639-3381  
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Email: [selectmen@sudbury.ma.us](mailto:selectmen@sudbury.ma.us)

November 29, 2011

Secretary Richard K. Sullivan, Jr.  
Executive Office of Energy and Environmental Affairs (EEA)  
Attn: MEPA Office  
Nicholas Zavalas, EEA No. 14814  
100 Cambridge Street, Suite 900  
Boston MA 02114

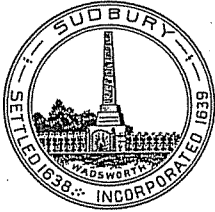
RE: The Residences at Johnson Farm, Sudbury, MA  
EEA #14814

Dear Secretary Sullivan and Mr. Zavalas:

The Town of Sudbury Board of Selectmen is very concerned about the project known as The Residences at Johnson Farm, and wishes to provide comments relative to this project and its potential environmental impacts. The Sudbury Board of Selectmen is very familiar with this property and held a public meeting on the proposal on July 27, 2010, as well as attended a site visit held with MassHousing and the applicant on June 22, 2010 while this application was in its preliminary phase. To our knowledge, despite the submittal of information with the Comprehensive Permit application this year, it appears that many issues have not been resolved nor addressed to the Town's satisfaction, and our comfort level as the application review period proceeds is diminishing.

For the record, Sudbury is not new to 40B and its controversies. The Town has had several recent, positive experiences with Comprehensive Permit applications. We have approved eight 40B developments with 231 total housing units over the past 10 years in development sizes ranging from 2 units to 73 units. Each application went through a rigorous review process, resulting in attractive developments in terms of size, scale, and style of housing. We have never denied a 40B application, but have worked with developers to shape their projects into developments that fit the neighborhood and produce benefits for both the new residents and the Town in general. Each of these developments has demonstrated that they will not harm the environment, nor cause significant off-site problems. Each development is located in an appropriate area for development that is denser than the surrounding zoning district, and each application has been supported by the Town to MassHousing or DHCD during the site approval process.

All that said, the Board of Selectmen has grave concerns for the potential impacts from this development, and cannot support the proposal as submitted. We have not



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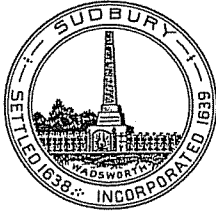
formed this position rashly, nor simply due to public outcry over the proposal. We have reviewed the materials submitted, including data from the applicant and memos from the Town's technical staff and consultants, and believe that a development of this size, on a parcel of land surrounded by wetlands, riverfront and flood plain, will have severe impacts that may not have the capability to be adequately mitigated.

Surface and groundwater concerns are paramount, as Sudbury is completely reliant on underground aquifers for our drinking water. The property is in an area of known high groundwater elevation, and within 5,000 feet to four of the Town's primary well fields and adjacent wetlands. Impacts from construction, as well as stormwater runoff and wastewater disposal, all contribute to the Town's unease with the size of the development proposed. We feel that the complex hydrology of the site may not allow for adequate protections against harmful disturbance to these ecosystems. Data submitted to date does not relieve our level of discomfort, particularly the proposed exclusive use of infiltration for stormwater and the overall size of the wastewater leaching field. The soils in these locations do not exhibit the ability to absorb water as proposed in the preliminary plans.

The property is identified on the Town's 2009 Open Space and Recreation Plan as a parcel that merits preservation due to a variety of factors, including groundwater resources, surface water resources, agriculture, wildlife, vegetation, geology, recreation, historic preservation, scenic views, connection to protected land, trails, public accessibility and size. The surrounding 150 acres of land are undeveloped and contribute to groundwater protection, wildlife corridors, riparian habitat and flood control. Constructing 10 buildings and roadways in the midst of these natural resources will have an irreversible impact, and does not comply with the Commonwealth's Sustainable Development Principles and "Smart Growth" Guidelines.

The traffic expected from the development will add 10% to the existing volume on Landham Road (or just under 900 additional trips per day). Landham Road is a narrow, 2 lane road, which, along with its tributary roads, may be able to absorb an increase in traffic of the magnitude expected with longer delays and queues. However, roads heading east off Landham Road regularly experience spring flooding and closure, and the additional traffic generated by this proposal will exacerbate problems during these annual events.

The Town has additional concerns related to agricultural chemicals and pesticides which may have been historically used on the property, and for which conventional testing and risk analysis is not normally conducted nor required. The MassHousing site eligibility letter dated January 20, 2011 requires the applicant to obtain a determination



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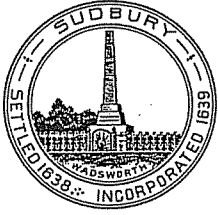
on the applicability of Executive Order #193 from the Massachusetts Department of Food and Agriculture, but none has been submitted.

In closing, the Town of Sudbury believes more information must be submitted in order to determine the full scope of environmental impacts that may occur as a result of this development, and urges a full Environmental Impact Report be required. Thank you for your thoughtful consideration of these comments.

Very truly yours,

Lawrence W. O'Brien  
Chairman

cc: Robert Moss, Moss Development  
Sudbury Zoning Board of Appeals



# Town of Sudbury

Planning and Community Development Department

Jody A. Kablack, Director

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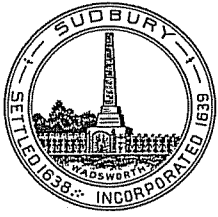
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Executive Office of Energy and Environmental Affairs (EEA)  
Attn: MEPA Office  
Nicholas Zavalas, EEA No. 14814  
100 Cambridge Street, Suite 900  
Boston MA 02114

RE: The Residences at Johnson Farm, Sudbury, MA  
EEA #14814

Dear Secretary Sullivan and Mr. Zavalas:

This office provides technical review for all development applications presented to the Town of Sudbury through all the land use permitting boards, including the Zoning Board of Appeals, Planning Board and Board of Selectmen. I have been reviewing this specific application for the last sixteen months, and am very familiar with the proposal and the information submitted to date, including the Environmental Notification Form (ENF). Please accept these comments as you review the above application pursuant to the Massachusetts Environmental Policy Act.

1. The Town of Sudbury has continually expressed a concern for the development as proposed to adequately protect against harmful disturbance to the surface and groundwater ecosystems on and adjacent to the project site. The property has a high groundwater condition and significant wetlands; 84% of the development area (320,000 square feet) is within a buffer zone to a bordering vegetated wetland, and the property directly abuts over 150 acres of undeveloped land that contributes to groundwater protection, wildlife corridors, riparian habitat and flood control. Impacts to these resources from the development have not been adequately discussed nor properly mitigated based on the application materials submitted to date:
  - a. The applicant has not submitted data on potential groundwater mounding effects due to the wastewater leaching fields, stormwater recharge or building foundation construction.
  - b. The applicant has not provided a fail-safe provision if the proposed system of stormwater management fails to perform. Based on current scientific literature, the method of stormwater management proposed for use throughout this development is not proven effective on such a large scale. Given the physical constraints of this site, failure of the stormwater management system to perform could have serious environmental impacts.
  - c. Construction of the stormwater management system is also of concern due to the sensitivity of soil compaction to the overall performance of the proposed



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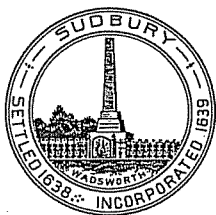
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- system. Given the limited amount of upland available for construction, documentation on construction sequencing, material stockpile areas and other mitigating features to ensure the soils are not permanently debilitated during construction has not been provided.
- d. The applicant has not submitted data on the impact to the wetlands and vernal pools due to disturbance of the ground surface in close proximity to the wetlands (including grading into the wetlands in several areas).
  - e. The applicant has not submitted data on the project's impact on the watershed, wildlife habitats and conservation areas as required by their MassHousing Project Eligibility Letter dated January 20, 2011.
  - f. The applicant has not demonstrated how the development complies with the Commonwealth's Sustainable Development Principles and "Smart Growth" Guidelines as required by their MassHousing Project Eligibility Letter dated January 20, 2011.
  - g. The applicant has not provided a Phase One Environmental Site Assessment as required by their MassHousing Project Eligibility Letter dated January 20, 2011.
2. The development alternatives discussed in the ENF do not meet several governing Town of Sudbury bylaws and regulations and do not provide the only alternatives for development of this property:
- a. Alternative Site: Parcels containing 8-9 contiguous acres of upland have not been explored. While the property is 35+ acres, the project is developed on less than 9 acres.
  - b. No Build: Although constructing the development will provide needed affordable housing, not constructing it will fulfill an open space goal. Both of these objectives are stated goals of the Town. Furthermore, the proposed development site has been specifically identified by the Town of Sudbury as a parcel appropriate for acquisition as open space.
  - c. Cul-de-sac with 7 (and 13) Residential Lots: Neither of these alternatives meet the Town of Sudbury subdivision regulation requiring a 360 foot separation between streets on the same side of the road (Stagecoach Lane). Additionally, no soil test data has been submitted indicating that the lots on the western side of the perennial stream are suitable for subsurface disposal of wastewater.
  - d. Multi-Unit with No Wetland Impacts: The number of units in this alternative could be expanded significantly if limited porous pavement were proposed and units situated in the areas set aside for stormwater management. Additionally, the size of the leaching field seems severely oversized for a 24 unit development, however without a scalable plan this is difficult to ascertain. The proposed development plans show 10,000 sq. ft. of leaching area for the full 120 unit plan. Using a similar calculation, only 2000 sq. ft. of



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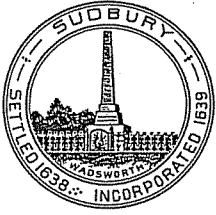
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- leaching area would be needed for the 24 unit plan. The “found” area could then be used for unit development.
- e. Site Plan Option 7: Figure 6 was not provided in the ENF.
  - f. Other Alternatives: It may be feasible to construct a 60-unit development (30-1BR units and 30-2BR units for a total of 90 bedrooms) with conventional stormwater and a Title V compliant wastewater disposal system with potentially fewer impacts to the surface and groundwater resources on the site. This alternative should be more fully explored.
3. The mitigation proposed by the applicant does not seem commensurate with the magnitude of the development and the potential impacts to the Town of Sudbury:
- a. The proposed concrete box culverts mentioned in the project narrative have been identified by the Town’s engineering and wetland consultants as potential problems for downstream abutters due to an increase in the size of the culvert (see attached letters from Joseph D. Peznola, P.E. dated Nov. 16, 2011, and Fredric W. King, P.E. dated Nov. 9, 2011, pg. 10). It has not been determined that this will be appropriate mitigation for the wetland alteration required.
  - b. The proposed wetland replication area mentioned in the project narrative has been identified by the Town’s wetland consultant as problematic (see attached letter from Fredric W. King, pg. 8).
  - c. The Landham Road/Route 20 intersection will be impacted by this proposal and the 10% estimated increase in traffic on Landham Road. This intersection is already at Level of Service F, is recommended for a traffic signal by the Central Transportation Planning Staff (CTPS) and is undergoing design for a signal by the Town. Some form of traffic mitigation should be included in the project.
  - d. This application has been subject to only 3 public hearing sessions, much of that time discussing incomplete application materials. Significant information has been requested from the applicant which may or may not require the imposition of additional mitigation for the project. We are unable at this time to fully comprehend all the impacts from this development, and therefore cannot produce a comprehensive list of potential mitigating factors.
4. While this proposal does not meet any of the mandatory thresholds for preparation of an Environmental Impact Report pursuant to 310 CMR 11.03, the potential impacts within several of the categories, the proximity of the property to other sensitive receptors (Sudbury River, Hop Brook, drinking water supply wells) and the project’s very aggressive use of a new technology (porous pavement) should be taken into consideration and require further study. Based on the above comments, I urge you to require an EIR for this proposal so that all issues can be thoroughly addressed and impacts mitigated prior to construction. The scope of the EIR should include:



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Jody A. Kablack, Director

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- a. A revised plan with a roadway layout acceptable to the Sudbury Assistant Fire Chief addressing public safety access concerns (see attached letter from John Whalen dated Oct. 21, 2011). Any roadway revisions or enlargements will be within wetland jurisdiction and further impacts must be discussed.
- b. A revised development alternative which negates the need for a wastewater treatment plant and uses a mixture of conventional stormwater management and limited porous pavement around the site.
- c. Identification and discussion regarding the vernal pools on the site and impacts from development to the associated groundwater levels and wildlife.
- d. Further information on the impacts of this proposal to wildlife habitat, the watershed and conservation lands in the area.
- e. Alternatives to the use of porous pavement in general.
- f. Further discussion on the construction, maintenance and operation of porous pavement roads, and the associated maintenance and operating costs, including necessary reserves.

In conclusion, there are many outstanding issues that should be further explored through an Environmental Impact Report in order to fully understand this project and its impacts. Thank you for your careful consideration of these comments.

Sincerely,

Jody Kablack

Director of Planning and Community Development

Attachments

cc: Robert Moss  
Zoning Board of Appeals



# HANCOCK

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## ASSOCIATES

November 16, 2011

Sudbury Board of Appeals  
c/o Ms. Jody Kablack  
Director of Planning and Community Development  
275 Old Lancaster Road, DPW Building  
Sudbury, MA 01776

RE: Porous Pavement Questions  
The Residences at Johnson Farm  
189 Landham Road, Sudbury, MA

Dear Ms. Kablack:

Hancock Associates would like to offer the following questions related to the project's porous pavement system design, installation and maintenance for the Board to pass along to Dr. Rosen and the development team.

1. The applicant should submit a more detailed construction sequence. The project is highly dependent on the successful use of porous pavement. UNH Design Specifications for Porous Asphalt Pavement (Oct. 2009) cautions against over compaction of native and sub-base materials by construction equipment. Due to the limited available space on site, construction vehicles will have to utilize all access drives and parking areas. How will the contractor protect against over compaction of the sub-base?
2. The applicant should provide additional support information for the "extended time of concentration" methodology implemented for the analysis of porous pavement. Normally a 5-minute time of concentration is used for small paved watersheds. Their analysis is using a 481-minute time of concentration. The applicant's approach results in a reduction of input flows for these subcatchments by an order of magnitude ten. The applicant's engineer refers to UNH studies defining the approach. Is the methodology based on theoretical models or actual field empirical data? Is documentation available?
3. The proposed porous pavement section includes only an 8" reservoir course with a 6" under-drain. This only allows for 2" of storage before engaging the drain. Could this lead to short circuiting the system increasing flow to the eleven "rain garden" areas? Should the under-drain pipe be laid at a positive slope or flat? If sloped, the reservoir course would have to be deeper.
4. Why does all the literature say it is appropriate for low traffic areas, yet they are proposing it for full use here?
5. Why haven't porous pavement systems been used more extensively for full development proposals like this one?
6. How would the system function if the porous pavement section fail? Would the outflows to basins be over-taxed?



7. How do the existing groundwater conditions at this site affect the performance of the system? Do they meet the minimum separation between seasonal high groundwater and the storage layer?
8. Do they meet the permeability rating recommended? Have they calculated it specifically for this site?
9. Can they explain the water quality monitoring results of the Greenland Meadows development? (I don't understand the graph in the materials they provided)
10. Does the proposed maintenance schedule meet the UNH recommendations? What is the plan for maintenance of the roadway?

I attended the site walk on November 9<sup>th</sup>. Two additional issues were discussed that require additional information from the applicant.

1. The grading shown for the wastewater effluent fields does not appear to reflect potential mounding resulting from the long-term loading. We believe mounding could result the need for substantial fill to raise the system. The applicant should further clarify the necessary grading to allow the Board to consider peripheral impacts.
2. With regard to the main stream crossing, the Applicant should provide additional information regarding the balance between meeting Army Corp stream crossing requirements and maintaining the upgrading impoundment capacity of the wetlands, which may be currently serving to protect down stream properties.

Lastly, I met with the Applicant's engineer and Bill Place regarding the pre-development contributing watershed to the property. Mr. Dougherty will be refining the mapping in the coming weeks and revising the drainage calculations for the project. We will hold off on further review pending answers to the questions above and receipt of the additional information.

Please do not hesitate to contact our office should you have any questions.

Sincerely,  
Hancock Associates,



Joseph D. Peznola, PE  
Principal- Branch Manager Marlborough

Sudbury Zoning Board of Appeals  
278 Old Sudbury Road  
Sudbury, MA 01776

November 9, 2011

RE: Wetland Bylaw Review - Comprehensive Permit Application (40B)  
Johnson Farm – 189 Landham Road, Sudbury, MA

Dear ZBA Members:

This report contains the findings of my review of the Application and submitted documents for the referenced project relative to the Sudbury Wetlands Administration Bylaw and the Regulations under the Bylaw (dated September 27, 2010). This review has been performed per our contract dated October 4, 2011 (executed October 12, 2011). The findings are based on the following:

- Attendance at the ZBA hearing on October 18, 2011.
- A site visit on October 28, 2011.
- Review of the subject Bylaw and Regulations.
- Review of the filed plans and documents including but not limited to:
  1. Comprehensive Permit Application (August 8, 2011)
  2. Comprehensive Permit Preliminary – Site Development Plans (as updated 10/4/11.
  3. Letter from Tetra Tech dated October 17, 2011 containing “Supplemental Stormwater Information”.
  4. Order of Resource Area Delineation issued by the Conservation Commission, dated 12/31/09.
  5. Plan for ANRAD Application dated revised 11/30/09. This plan shows the wetland resource areas on the site under the Bylaw and Wetlands Protection Act.
- For information relative to the Wetlands Administration Bylaw, and a more complete understanding of the project, the Notice of Intent and Stormwater Management Plan (10/4/11) as submitted to the Conservation Commission under the Mass. Wetlands Protection Act were reviewed.

40 B Application:

It is my understanding that under the Ch. 40B Comprehensive Permit process, the ZBA acts as the Conservation Commission under the Sudbury Wetlands Administration Bylaw. The permit and any granting of waivers are issued as part of the Comprehensive Permit. As such, the Applicant must file sufficient information and submittals for an application under the Bylaw so that the ZBA can evaluate compliance with the requirements of the Bylaw and Regulations. For those

24178

Zoning Board of Appeals

November 9, 2011

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 2

provisions of the bylaw that are not possible for the Applicant to meet, the application needs to clearly identify those specific provisions that require waivers and why it is not possible to meet those requirements so that the ZBA can properly evaluate whether or not to grant the waivers. For provisions where waivers are not specifically requested, information supporting how the project is designed to comply would be expected. There is no automatic exemption from the bylaw, nor are there any automatic waivers of provisions.

SBNE RECOMMENDATION regarding the above understanding:  
I would recommend that the ZBA consult with Counsel and the 40B Consultant relative to the validity of the above understanding, or where correction or clarification is needed.

The information contained in the Comprehensive Permit Application relative to the Wetlands Administration Bylaw and Regulations is very limited. Section 6 of the Narrative contains a summary of the Wetlands Resource Areas under the Mass. Wetlands Protection Act and the Bylaw and there is a listing of waivers being requested under the Bylaw and Regulations. No information as to how the project meets any of the requirements under the Bylaw and the Regulations has been provided. Based on my review of the submitted materials, it is my opinion that insufficient information has been provided for the ZBA to evaluate the application under the Bylaw. The following are comments based on the information provided.

#### 1. LISTING OF WAIVERS

The listing of requested waivers provided in the Application for Wetlands Administration lacks specific information and is also confusing. Examples are as follows:

- 1.1 The first item in the list identifies the applicable section of the Wetlands Administration Bylaw as “All Sections”. Subject is “Wetlands Resource Area Protection”, and the Requirement is identified as “Additional jurisdiction/buffer zones may be imposed under local bylaw.”

#### SBNE COMMENTS:

- This appears to imply that there is a discretionary authority to add jurisdiction and resource areas that the Applicant fears may cause an issue with compliance under the Bylaw, and that the applicant is

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 3

requesting a waiver from any section of the Bylaw that permits that to occur.

- In fact, additional resource areas beyond those included in the Mass. Wetlands Protection Act are already encoded in the Bylaw. These include such resource areas such as Vernal Pools, Lakes, Ponds, and “certain adjacent upland areas (collectively “the adjacent upland resource areas protected by this bylaw”).” These resources are well defined in the bylaw, and procedures and standards are included in the Regulations. I do not see any provisions in the Bylaw or Regulations that allow the Conservation Commission (ZBA in this case) to add jurisdiction.

1.2 The Waiver listing then continues and lists 7 specific sections of the Regulations as requiring waivers. In 3 of listed sections (7.2, 7.3, and 7.10), the “Requirement” sections states that the problem requirement is that the regulations “allow the Conservation Commission to potentially impose conditions that would prohibit work” in the applicable section.

- SBNE COMMENT: For all these cases, no specific information has been provided on which to evaluate how the project has been designed to meet the standards. Nor is there information on how the project has been designed to meet them to some extent to meet the intent of the Bylaw to the extent possible for the project so that the actual waiver being requested can be evaluated.

1.3 Under the “Requested Waiver/Project Applicability” section, the applicant provides the statements that I include verbatim in italic as follows:

*Insofar as: 1) these are general and not specific requirements granting discretion to the Conservation Commission to impose conditions under Article XXII, and 2) The Applicant is not required to file under the Local By-Law pursuant to Ch. 40B, the applicant requests a waiver from these requirements to the extent the same are applicable to this Application.*

The Applicant then goes on to say:

*The Project shall comply with the provisions of the Wetlands Protection Act, MGL Ch 131, sec 40 and the applicable regulations at 310 CMR 10.00 et seq., as well as applicable MassDEP groundwater discharge requirements.*

SBNE COMMENTS:

- This needs clarification as to what is actually being requested here. On the one hand it appears to be asking for waivers from the specific sections of the Regulations as listed relative to particular issues generally relating to the discretion of the Conservation Commission. The finishing sentence, however, indicating that the project will meet the state regulations with no mention as to compliance with provisions of the bylaw seems to imply that the Applicant is requesting a blanket waiver on the entire bylaw.
- Regarding the Applicant's point 2), I would recommend that the ZBA consult with Counsel and the 40B Consultant relative to the validity of the statement that the Applicant does not need to file under the Bylaw. I would agree that the filing is not to the Conservation Commission, but rather is part of the Comprehensive Permit Filing administered by the ZBA. It is my understanding that the project is not exempt from the provisions of the Bylaw.
- Requesting a blanket waiver is a substantially different technical review than where waivers from only certain sections are being requested. Clarification of this is necessary for me to proceed further with this review. A blanket waiver request would indicate that the Applicant has somehow determined that compliance with all parts of the Bylaw is not possible. In this event, the applicant should provide information as to why it not possible to configure the project to meet any part of the Bylaw and Regulations.

2. General Comments on the Project, and Submittal Plans and Documents Relative to the Wetlands Administration Bylaw and Regulations:

As stated above, in reviewing a submittal under the Bylaw, we would expect there would be a substantial narrative and supporting plans and documents describing how the project meets the requirements of the Bylaw and associated Regulations. In those areas where strict compliance with the requirements cannot be met, information is generally required describing the non-compliance and mitigation being provided to off-set the impact to the values and functions of the affected Resource Areas.

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 5

Under Section 7 of the Bylaw (Permits and Conditions), the reviewing authority must determine whether satisfactory efforts have been made to avoid impacts and to “prevent unacceptable significant or cumulative effects upon the resource area values protected by this bylaw; and where no conditions are adequate to protect those values.” This is not dissimilar to the standard practice under the Mass. Wetlands Regulations and other wetland laws to first avoid impacts, and where not feasible, to then minimize the impacts and mitigate to offset those impacts in accordance with the provisions of the Regulations.

In this case, the project as designed includes substantial direct impacts of resource areas under the bylaw. This includes direct alteration of : 10,485 SF of BVW; 49,920 SF of Riverfront (Adjacent Upland Resource Area to a Perennial Stream under the Bylaw); two stream crossings with associated Bank and Land Under Water alterations; and extensive alterations of “Adjacent Upland Resource Areas” (AURA). The actual aerial extent of the direct impacts to that latter Resource Area has not been determined

## 2.1 Alternatives Analysis

Generally, the first step for evaluating whether efforts have been made to avoid and minimize impacts is review of an alternatives analysis. This Analysis is prepared by the Applicant to demonstrate, given the purpose and use of the project, that reasonable feasible measures to avoid and minimize the alterations of the resource areas have been assessed. In this case the project purpose and use is to develop a multi-family rental housing project. Under the 40B process, it may be argued by the Applicant that, in order to be “economic” it must be a certain size, in this case, the project is proposed to be 120 units for the Applicant’s “preferred alternative”.

The question to be answered by the analysis is whether the project can be configured to avoid and reduce the proposed impacts and remain economically viable? An Alternatives Analysis has been prepared and submitted to the Conservation Commission as part of the Notice of Intent (NOI) filing under the Mass Wetlands Protection Act. The following are some comments regarding the analysis prepared as it relates to the Bylaw:

- a) The analysis looked at abutting properties for alternative means of access to avoid or reduce wetland impacts related to the main stream crossing. The only routes with any possibility of providing access to the central portion of the site, other than the proposed stream crossing, are related to access from Cutler Farm Road. However, the analysis found no feasible routes that would

24178

Zoning Board of Appeals

November 9, 2011

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 6

be available through abutting properties due to various logistics and cost. There is also a blanket statement that Cutler Farm Road would not be suitable for access for this project as it was not designed to handle the traffic that would be associated with this development. The analysis also looked at alternatives for bridging the wetlands to reduce impacts which were determined by the Applicant to be cost prohibitive.

#### COMMENTS

- The use of Cutler Farm Road for access may or may not be a workable solution for the project, but there is no supporting information provided relative to the traffic capacity, neighborhood impacts, etc. on which to evaluate this.
  - The use of the Donovan Property off the southeast portion of the site was not investigated. That property has access to the Cutler Farm Road via a paper street. An access route appears feasible that would be of similar length to the proposed crossing, but would only require a short crossing of a small intermittent stream rather than the long crossing of the perennial stream. The route would require alteration of the outer Riverfront (200 ft. AURA), which would be significantly less intrusive than the AURA alterations proposed. To be complete, this alternative should be investigated.
- b) The Analysis looked at several different development schemes for the property including a large condo development, single family subdivisions, a 2 lot ANR for single family houses, an apartment building scheme with 24 units with no wetlands alterations at the front of the property, and a minor alteration of the current project plan that eliminates the crossing of an intermittent stream.

#### COMMENTS

- The last alternative in the above list is the only one that looks at modifications of the current plans to look at alternatives to reduce wetlands impacts. That one was rejected by the applicant as it would eliminate the loop road which was deemed more important for access and safety reasons than the minor decrease in wetlands alterations.
- Due to the extensive wetland resource area alterations proposed, it would be very important to provide a more thorough evaluation of alternatives to reduce the wetland impacts. Obvious examples to name a few would include:



- 1) Can the 120 units be consolidated into a smaller number of taller buildings with consolidation of parking and perhaps multi story parking garage(s) to reduce the footprint of the development?
- 2) Could some of the units be placed at the front of the site in multi-story buildings, reducing the number of units and extent of alteration in the central portion of the site?
- 3) Could the Office be included in one of the buildings?

Note that SBNE is not advocating for any particular alternative, only a thorough evaluation given the extensive amount of wetlands resource area alterations being proposed.

## 2.2 Vernal Pools

The bylaw protects vernal pools, whether or not they have been previously certified by the Mass Fish and Wildlife – Natural Heritage and Endangered Species Program (NHESP). Under the Abbreviated Notice of Resource Area Determination process for this land, the Conservation Commission found four large “Potential Vernal Pools” on the site that are protected under the Bylaw. The largest of the pools is also identified by the NHESP as a Potential Vernal Pool. The approved ANRAD Plan shows those pools. Those pools have been removed from the site plans submitted. All of the pools are directly adjacent to the proposed development and one is virtually surrounded by the development.

The bylaw presumes that these are vernal pools and provides a process where the presumption can be overcome via an assessment of the pools as to whether they are, or are not, viable vernal pool habitat. The project does avoid “direct alteration” of the pools but, given the habitat significance of the Adjacent Upland Resource Area around Vernal Pools as migration areas and living areas of species utilizing the pools, alteration of the Adjacent Upland Resource Area may have significant unacceptable environmental impacts. No information has been provided on which to evaluate that impact for the ZBA to make this important determination for this project.

The evaluation of the Vernal Pools can best be done in March and April. I recommend that this evaluation be performed to provide that information.

## 2.3 Adjacent Upland Resource Area (AURA)

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 8

As stated earlier in this report, substantial permanent alterations of this resource area are proposed. No information has been provided as to the actual aerial extent of alteration of the AURA and I did not see any information on an assessment of the values and functions or any mitigation proposed to offset those direct impacts.

The Applicant correctly points out that the subject site is not within a mapped Estimated Habitat of Rare Wildlife or a Priority Habitat of Rare Species. However, there are numerous indicators as to the potential value of the wetlands resource areas and the AURA relative to wildlife habitat value. These include:

- The known potential vernal pools on the site as discussed above.
- Mapped Priority and Estimated Habitat exists directly across Landham Road from the site.
- Except for the eastern portion of the site, the remainder of the site is identified by the State as “Core Habitat” on the BioMap2 mapping. *Note that these maps are a planning tool to identify potential significant areas with wildlife value for general open space protection considerations and are not designed for regulatory use. They are mentioned here as indicators of potential values to be considered for study.*

A Wildlife Habitat Evaluation (Form B) has been prepared for the wetland crossing area. Given the extensive direct and permanent alteration of the AURA and Riverfront at the site, a Habitat Evaluation of the other impacted resource areas under the Bylaw should be requested.

#### 2.4 Wetland Replication Area (WRA)

The project will permanently alter over 10,485 SF of Bordering Vegetated Wetland. As mitigation, the construction of a 21,000 SF Wetland Replication Area is proposed. The area being proposed is twice the area the BVW to be lost as required in the Sudbury Wetlands Administration Bylaw Regulations. The Replication Area is generally being designed per the applicable DEP Standards with a several important exceptions that, in my opinion, make this design not in conformance with the both the WPA Regulations and the Sudbury Bylaw. These are as follows:

- a) The proposed WRA is being located between two BVW areas that are at different elevations. The wetland bordering on the Perennial Stream is to the east of the WRA, and a BVW to the west is at a higher elevation. The plan calls for a 2 foot cut directly adjacent to the westerly wetland. Given the sandy nature of the soils, this will lower the water table at the wetland to the west, which in effect will change the hydrology of that

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 9

wetland. It would likely change a portion of that area to upland. This impact needs to be addressed, and perhaps a more suitable location found for the WRA.

- b) The WRA does not address the loss of flood storage at the wetland crossing. By the Engineers calculations contained in the Stormwater Report, the 100 year flood elevation on the upstream side of the cart road is computed to be at 124.3 ft. This elevation is entirely within the BVW so there is no Bordering Land Subject To Flooding under the WPA and Bylaw, however this adds a value of flood storage capacity to the BVW that must be addressed. (WPA Regs 10.55(4)(b)7.) In order to provide compensating flood storage, at least a portion of the WRA would need to be upstream of the culvert. The engineer should also consider providing more accurate computations to determine the flood elevation to take into account the actual existing pipe (field measured during the site visit as 32 X 50 CM Pipe Arch which is probably a standard 33 X 49), as well as the actual cart road profile for predicted over topping. This will likely lower the computed flood elevation.
- c) The proposed wetland being filled is presently a mix of shrub swamp and wet meadow. The plantings being proposed appear to be attempting to create a wooded swamp.
- d) The plan for the replication is a narrative type. An actual planting plan is recommended for the final plan.
- e) The Applicant appears to be requesting waivers from four provisions of the Wetland Replication Area section of the Wetlands Administration Bylaw Regulations (7.8.1, 7.8.2, 7.8.4 and 7.8.8).

7.8.1 Requires the WRA to be built and approved prior to the construction of any structures. The Applicant should provide information as to why waiting for the WRA to be completed will render the project uneconomic. Over the years there have been many failures of WRAs to be successful as planned. Also, there has been experience that the WRAs are not constructed until the end of a project and compliance issues arise. The intent here is to insure proper performance. If there is a time issue, perhaps the Applicant could offer a compromise that resolves this issue.

7.8.2 Requires a 2:1 Ratio of replication, but the Commission (ZBA) in this case, may require more where warranted. The Applicant has offered 2:1. Depending on the situation, the Applicant may not need a waiver of this provision.

7.8.4 This section requires the possible replication of AURA where it is disturbed for the construction of a WRA. I will consult with the Conservation Agent for clarification on this item to determine what the Conservation Commission policy is relative to methods of compliance with this requirement.

7.8.8 This section requires a bond to insure proper completion of the WRA. Similar to the response to 7.8.1, perhaps the Applicant can offer some other method of suitable assurance in the event that the WRA is not successful or not completed, and why this item is problematic.

#### 2.5. Wetland Crossing Culverts

As part of the Mitigation for the wetland crossings, the Applicant has proposed providing culverts that meet the Mass. Stream Crossing Standards. If there is going to be crossings of the streams on the project, I concur that they should be designed to meet those standards and it is my opinion that meeting those standards is feasible at the site. However, I have several issues regarding the submittal:

- a) No computations have been submitted supporting that the culverts as designed meet the standards. (Openness Ratio, etc.)
- b) The main stream crossing culvert as designed will lower the flood elevation of the area upstream of the culvert by the Engineers own calculations. This needs to be considered and addressed relative to the impacts to the upstream and downstream wetland.
- c) The design detail does not show the information needed to replicate the natural stream channel and banks within the culvert for hydraulic considerations, stability and wildlife passage. There are good examples of the natural stream channel upstream and downstream of the culvert.
- d) The channel will be focusing stream flow at one point rather than a broad overtopping of the cart road as the engineers calculations predict. The engineer needs to look at velocities through the culvert and design the channel section accordingly to prevent washout of the channel.

#### 2.6 Stream Crossing

Note that the hearing under the Wetlands Protection Act is presently in process by the Conservation Commission. One of the items to be considered is whether the proposed crossing of the perennial stream at the site qualifies as a Limited Project

24178

Zoning Board of Appeals

November 9, 2011

RE: Johnson Farm – 40B Application  
Sudbury Wetlands Bylaw Review

Page 11

that would permit the crossing at the site. This is a key question relative to the project and no determination has been made relative to this at this point.

**Preliminary Conclusion**

Based on the above, it is not possible to perform a complete the evaluation at this time. Certain matters need to be clarified as to exactly what is being requested for waivers and what parts of the bylaw the Applicant it attempting to meet. There is insufficient information on which to evaluate compliance with the bylaw and regulations and for the ZBA to evaluate whether there will or will not be “unacceptable significant or cumulative effects upon the resource area values protected by the bylaw; and where no conditions are adequate to protect those values.” Additional alternatives need to be investigated to demonstrate avoidance and minimization of resource area alterations and impacts.

An area where the Applicant has submitted information sufficient to determine compliance with the Bylaw Regulations is relative to the Wetland Replication Area. For that Item, my comments are complete, insofar as the current plans and submittal, and my opinion is that the proposal as shown is not in compliance relative to that item for the reasons detailed in this report.

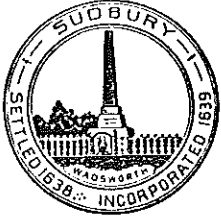
If you have any questions regarding this report, please do not hesitate to contact me.

Sincerely,



Fredric W. King, P.E.  
Senior Project Manager  
Senior Wetlands Specialist

CC: Jody Kablack



## TOWN OF SUDBURY

### Conservation Commission

Sudbury, Massachusetts 01776  
Tel. (508) 443-8891 2209  
FAX (508) 443-0756

November 9, 2011

Secretary Richard K. Sullivan, Jr.  
Executive Office of Energy and Environmental Affairs (EEA)  
Attn: MEPA Office  
Nicholas Zavola, EEA No. 14818  
100 Cambridge Street, Suite 900  
Boston MA 02114

Re: The Residences at Johnson Farm  
189 Landham Rd., Sudbury MA

Dear Secretary Sullivan,

The Sudbury Conservation Commission is submitting comments on the above-referenced project. The project consists of the construction of 120 units of residential rental housing (25% affordable) in ten (10) three-story buildings of twelve (12) units each. Also proposed are a rental office, garages, visitor parking, new interior roadway, stormwater infiltration basins, and a private wastewater treatment plant for the discharge of 19,800 new gpd for a site total of 19,800 gpd.

Based on a review of the 40B application to the ZBA, information and questions discussed at the ZBA hearings, the Mass Housing Site Eligibility letter; the Wetlands Protection Act Notice of intent; and information and questions/issues raised to date at Conservation Commission wetland hearings held 10/27, 11/14 and continued to 1/9/12; several site walks; and the discussion with Nick Zavalas of MEPA, the Sudbury Conservation Commission submits the following comments.

*The Conservation Commission strongly recommends that the applicant be required to file a full EIR for this project. The project as presented appears very likely to cause both direct and indirect damage to the environment.* At least 10,485 sq. ft. of bordering vegetated wetland and 49,920 sq. ft. river front area are to be altered. A wetland replication plan has been submitted for 2:1 restoration in an upland area that may further alter the wetland resources by removal of shade trees, changing of temperature in the receiving waters, impacts to wildlife breeding, over-wintering, cover, feeding and migrating. This in turn may lead to impacts to chemical and biological processes and composition in the wetlands.

The applicant has failed to identify all wetland resource area values & functions for the interests of the Act. Applicant has not identified designated significant habitat for those functions noted directly above. In addition, the Commission's wetland consultant, Fredric King of Schofield Brothers, Inc., has determined that the wetland replication plan will ultimately drain a bordering vegetated wetland (see attached letter dated 11/14/11 from Mr. King to the Commission)

Review of the MEPA Regulations and the project description indicates that the project may meet or exceed *mandatory* thresholds for an EIR. Not enough information has been

provided to the town or MEPA in the ENF to make this final determination. MEPA jurisdiction extends beyond alteration of bordering vegetated wetland (bvwt). Under 301 CMR 11.03 a Mandatory EIR is triggered if the project will alter greater than 1 acre of bvwt. Based on the wetland consultant's report dated 11/14/2011, the wetland replication area as designed will drain one of the bvwt it borders and place the total amount of bvwt alteration in excess of one acre. In addition, the wetland replication area does not meet the performance standards in 310 CMR 10.55(4) (b) (for elevations, similar vegetation, and flood storage, etc.) and the Commission has not as yet ruled on whether or not the project 1) qualifies as a Limited Project under 10.53; and if so; 2) whether or not they will permit this extensive amount of wetland alteration under their discretionary provision.

Further, the potential alteration 1000 sq. ft. or more of Outstanding Resource Water (ORW)(under 314 CMR 10 ORW includes the wetlands around the vernal pools) triggers an EIR. The applicant has yet to identify the actual known locations of confirmed vernal pools, the species found in those pools and adjacent wetland areas. In fact the applicant has presented conflicting testimony at public hearings concerning the existence of vernal pools.

Expansion of fill in a floodway section and alteration of ½ acre or more of any other wetlands resource areas (river front area, bordering land subject to flooding) requires the mandatory EIR. The project appears to trigger both of these thresholds.

The scope of the EIR should include:

- A revised plan with a roadway layout acceptable to the Sudbury Fire Chief addressing public safety access concerns as any roadway revisions or enlargements will be within wetland jurisdiction and any changes could have significant impact on resource areas.
- Mapping, identification, wildlife habitat analysis for the vernal pools. These pools are given Class B designation under MA surface water quality standards. The MEPA meeting was the first time the applicant had disclosed that they confirmed 4 vernal pools on the site. WPA can protect vernal pools even if they are not yet NHESP certified. It might appear that the applicant is stalling release of this information and subsequent certification to circumvent the MA WQS criteria for Class B ORWs.
- The Army Corps of Engineers will need to review the impacts of the elimination of the centrally-located "isolated land subject to flooding area". ACOE will also have jurisdiction over 750 ft. area surrounding the vernal pools under the Jan. 21, 2010 revision to the Category II of the General Permit. Greater than 5,000 sq. ft. of alteration to a vernal pool requires an ACOE Category II permit application.
- Under 314 CMR 9.06 a bridge alternative does not take cost into account. This is a major issue for the alternatives analysis that the applicant has refused to discuss with the Commission as it is outside the WPA.
- If porous pavement fails there will be a discharge of untreated water to ORW. Even if designed, installed, and maintained perfectly, the system will increase the amount of chloride infiltrated into the groundwater. This system cannot use sand. It requires chloride for both pre-treatment as well as during and after storm events. Failure of the porous pavement will not be readily evident and treatment of runoff may be compromised or eliminated until after harm to the environment has occurred.
- Use of porous pavement will result in infiltration within 50' of bordering vegetated wetlands. As a stormwater structure, the proximity of infiltration through the porous



pavement to the wetland resource area is contrary to standards in the Massachusetts Stormwater Handbook.

- As the project is a dense rental apartment complex, residents may not be as aware of the site restrictions as a homeowner might be. Changing car fluids, adding some sand to steps, walkways, garage areas, and patios could occur. There is no back-up system for when the void spaces in the porous pavement clog.
- A mapped Zone II is located along the west property boundary of the site. No direct alteration within Zone II is proposed but there is no discussion of indirect impacts from recharge of runoff laden with chloride-based deicing products. The mapped direction of groundwater flow has not been submitted. High and Medium yield aquifers abut the property directly to the south and southwest.
- There is no soil test data for any area of the road bed. Soils are variable based on the outcome of the wetland ORAD.
- The alternatives analysis is incomplete. Use of the front fields for any many of the buildings as possible will result in a larger setback of disturbance to the wetland. This is important not only for the construction and loss of natural areas, but also for the secondary impacts that result from human use of the land (lights, pets, encroachment, noise, etc.)
- Full details on the design of the roadway crossing of the perennial stream. The project should meet Massachusetts Stream Crossing Standards at a minimum.
- Further alternatives analysis needs to happen. Other sites other configurations should be given every consideration. Johnson Farm is a development on an island sited to maintain aesthetics at the Landham Rd. frontage at the expense of the sensitive environment located interior to the property. Contrary to developer's statements at public meetings, the frontage field will likely be mounded and a wider roadway be constructed. Extensive fill will be brought to the site to raise it up to 10' in some areas, particularly to the north. The front fields will not remain unchanged and should be considered for dwelling unit relocation to increase the overall proximity of disturbance to wetlands. Layout of the development favors aesthetics of building behind a wooded buffer and altering 49,9200 RFA and 10,485 bvw rather than utilizing some or all of the front field. For Sudbury, a Town reliant on public & private groundwater wells for potable water, and individual septic systems for septic effluent disposal, impacting environmental values when other alternatives exist is short-sighted. Developer does not, as MassHousing presumed in their site eligibility letter, avoid construction in wetland areas with their plan.
- FEMA mapping is incomplete. The 100 yr. flood elevation by FEMA is over 2' lower than the elevation calculated by the applicant's engineer at the wetland crossing. Further investigation is needed.
- No information was offered on the proposed private irrigation well, particularly as it might impact the vernal pools. The preliminary filing with ZBA (for MassHousing site eligibly) indicates a possible reuse of WWTP water. Nothing further was presented. Was this volume factored into porous pavement design?

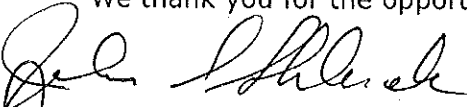
The Sudbury Conservation Commission has further concerns with the development as it should meet the Mass Housing eligibility letter requirements. It fails on the following MassHousing requirements:

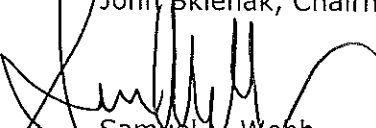
- Commonwealth's Sustainable Development Principles are not included in the project;
- Site entry/egress is not in compliance with Towns requirements for safe design (ref Fire Chief comments);
- Submissions to ZBA and CC do not address protection of watershed, drainage, wetlands, vernal pools, wildlife habitats, and conservation areas. Wetland interests, vernal pools, wildlife habitats, and impacts to abutting conservation areas have not been included in the permit applications even though this information has been request at the nights of hearings held to date with the Conservation Commission;
- Protection of public water supply has not been addressed as far the issue of the need to apply chloride-based chemicals, both as a pre-treatment and treatment, of the porous pavement;
- Results of the mounding analysis for the WWTP leach fields have not been submitted to the Town;
- Is the \$2,020,000 purchase price for a property appraised for only \$700,000 driving the need for applicant to have high infrastructure costs to raise his overall expenditures and thereby permitting raising his profits?
- At pre-application meetings with the applicant in 2010, he indicated the extent of wetlands affects the final number of units and the final purchase price. An alternative may be less units, lowering cost of land to reflect responsible development that will not damage the environment. Applicant has stated numerous times in numerous public forums that he will not consider a reduction in the size of the project. Project is still subject to an offer based on the final number of units.

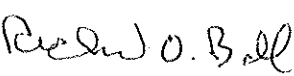
In summary, the project has become a negotiation for information necessary to fully and openly assess environmental impacts. The applicant remains vague in his responses to Commission questions and requests. The offer is well above any appraised values. Much of the detail of the development is not included in any filing currently before the Town. MEPA requirements can and must be accurate and specific. Therefore, requiring the EIR would allow all permitting authorities to be looking at and reacting to the same scope of information. The applicant has not been forthcoming with much of the necessary data as noted in this letter.

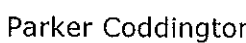
To ensure MEPA's mission of no damage to the environment, an EIR with the comprehensive scope recommended above and augmented by the requests of other reviewing agencies is the first step to successful discharge of MEPA's mission.

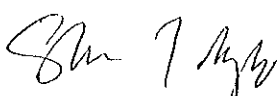
We thank you for the opportunity to provide these comments.

  
John Eklenak, Chairman

  
Samuel L. Webb

  
Richard O. Bell

  
Parker Coddington

  
Sharon Rizzo

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24179

Sudbury Conservation Commission  
275 Old Lancaster Road  
Sudbury, MA 01776

November 14, 2011

RE: **MassDEP File No. 301-1068** Notice of Intent - Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Dear Commission Members:

This report contains the findings of my initial review of the Notice of Intent submittal filed by Robert Moss of Madison Place Sudbury LLC (Applicant) under the Massachusetts Wetlands Protection Act (MGL Ch. 131, s. 40), for a residential apartment development at the subject site. This review has been performed per our contract/proposal dated October 12, 2011. We have reviewed the NOI application for general completeness and the project design and documents for compliance with the Mass. Wetlands Protection Act Regulations (310 CMR 10.00 et. Seq.) and for general good engineering practice. Our findings are based on the following submitted documents, plans and information:

- Attendance at the Wetlands Protection Act hearing on October 24, 2011.
- A site visit on October 28, 2011.
- Review of the filed plans and documents including but not limited to:
  1. Notice of Intent and attached documents contained in the NOI booklet (October 4, 2011)
  2. Site Development Plans entitled "Comprehensive Permit Preliminary - Site Development Plans, The Residences at Johnson Farm..." (as updated 10/4/11) containing 20 sheets.
  3. Landscape Plans prepared by Sudbury Design Group dated 8/5/11 (6 sheets).
  4. "Storm Management Plan, The Residences at Johnson Farm..." Dated October 4, 2011 prepared by Tetra Tech.
  5. Letter from Tetra Tech dated October 17, 2011 containing "Supplemental Stormwater Information".
  6. Supplemental Information provided by Tetra Tech dated November 7, 2011 relative to Porous Pavement.
  7. Order of Resource Area Delineation issued by the Conservation Commission, dated 12/31/09.
  8. Plan for ANRAD Application dated revised 11/30/09. This plan shows the wetland resource areas on the site under the Bylaw and Wetlands Protection Act.
  9. Letter to the Conservation Commission by Attorney Jonathan Witten (of Huggins and Witten, LLC) dated October 21, 2011.

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 2

10. Letter to the Conservation Commission by Attorney Jonathan Witten (of Huggins and Witten, LLC) dated November 9, 2011.

- As additional background information and a more complete understanding of the project, the Comprehensive Permit Application filed with the Zoning Board of Appeals for the project dated August 8, 2011 under MGL Ch. 40B was also reviewed.
- For additional information on porous pavement, we reviewed the available information on the UNH Website.

#### **1. Wetlands Resource Areas:**

The boundaries of the wetlands resource areas at the subject property were the subject of an Abbreviated Notice of Resource Area Delineation (ANRAD) and the subsequent issuance of an Order of Resource Area Delineation (ORAD) issued by the Sudbury Conservation Commission 12/31/09. The Resource Areas defined under the Wetlands Protection Act determined by the ORAD included Bordering Vegetated Wetlands (BVW) and Riverfront Area. The determination of "Bank" were included as part of the determination of the Mean Annual High Water Line for the delineation of the Riverfront boundary. The ORAD also included several other Resource Areas protected under the Sudbury Wetlands Administration Bylaw, which are not subject to this NOI filing.

SBNE compared the Final ANRAD Plan approved By the Conservation Commission for BVW, Riverfront and Banks with the plans submitted with the NOI and found the delineations of the Resource Areas depicted are consistent with the approved plan. As these boundaries are fixed per the ORAD, we did not review the delineations other than as described above.

With respect to Buffer Zones, the plans show a 25-foot Buffer from the BVW but do not show the 100-foot Buffer Zone. That line should be shown as it defines the jurisdictional boundary under the WPA and helps in the evaluation of work in close proximity to the wetlands resource areas. The significance of the 25-foot buffer was not discussed in the filing. Based on review of the plans, it appears that the Applicant is attempting to keep major structures and most impervious surfaces out of that area except at the crossing site.

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 3

Relative to Bordering Land Subject to Flooding (BLSF), the National Flood Insurance Program mapping defines the elevation of the 100-year flood along Hop Brook to be Elevation 122.0 (NAVD 88). According to the survey base plan for the subject Site Plans are based on that datum so these elevations and contours shown are directly applicable to the site plans.

I would agree that the limit of Land Subject to Flooding below (north of) the cart road would be 122.0. However, the area south of the cart road is above the limit of the NFIP flood study. For such areas, the Regulations at 10.57(2)(a)3 provide that the approving authority may require the Applicant to determine the boundary by engineering calculations. In this case, the Applicant's Engineer has performed calculations that determined the 100 year flood elevation to be at 124.3 +/- . The Engineer used a conservative approach and utilized a 100-year rainfall depth of 8.6 inches rather than 7.0 inches as specified by the Regulations, so the computed elevation may be higher than if the 7.0 inch rainfall depth was utilized. The engineer also did not consider the overtopping of the cart road in his calculations, which would also produce conservative results. However, given the approximate elevation of crest of the cart road, the elevation is probably not too far off and could be used unless more detailed calculations are produced.

The 124.3 elevation appears to be all within the BVW so there is no area that is solely defined as BLSF, however, it is important for the flood value of this area to be recognized, as any proposed a filling or alteration must provide compensating flood storage. This is discussed further in the discussion on the Wetland Replication Area later in this report.

## **2. Limited Project Status**

The project as presently designed proposes the filling and alteration of 10,485 SF of BVW and 10,380 SF of the inner 100 foot of the Riverfront Area. As such, the project as designed cannot meet the general performance standards 310CMR 10.55 and 10.58. The project is being submitted claiming qualification as a Limited Project for an access roadway under 10.53(3)(e) which "the issuing authority may" approve while not meeting the general performance standards for the resource areas. In addition to the information contained in the referenced section, more explanation on this section is contained in DEP Wetlands Policy 88-2: Access Roadways.

A finding that the project qualifies, or does not qualify, for this Limited Project provision is critical for this Notice of Intent submittal. If the project does not qualify,

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 4

the project must be denied because the project does not meet the General Performance Standards as identified above. If the project is found to qualify, the Commission may consider issuing an Order that could approve the project.

The Applicant makes detailed arguments that the project qualifies for this provision. The argument is based on the fact that a substantial portion of “upland” on this site is not accessible without the proposed access driveway and associated wetlands alterations. Supporting information is provided to demonstrate that “there are no reasonable alternative means of access from a public way to the upland area of the same owner....” The supporting information includes an analysis of alternatives. Further review findings on the supporting information are included later in this section.

A detailed argument has also been presented by Attorney Jonathan Witten, representing abutters to the project, supporting his contention that the project does not qualify as a Limited Project. (See letters by Witten 10/21/11 and 11/9/11).

Given the conflicting legal arguments, the final decision on this is a complicated legal matter and beyond the scope of my review. I would recommend that the Commission seek legal counsel, if possible, relative to this matter. Both the Applicant and Attorney Witten cite case law and DEP decisions relative to this question that I recommend be reviewed for applicability to the subject project.

Within the scope of my review, I have the following comments relative to the submitted materials for the Limited Project requirements.

#### Alternatives Analysis – Limited Project Status

Under the Limited Project Access Roadway section 10.53(3)(e), “the issuing authority may require the applicant to utilize access over an adjacent parcel of land ....in which the applicant has, or can obtain an ownership interest.” Similar language relative alternatives analysis requirements are contained in the Mass. Water Quality Certification Regulations at 314 CMR 9.06(1)(c)1.

To satisfy this requirement, an Alternatives Analysis has been prepared and submitted to the Conservation Commission as part of the Notice of Intent (NOI) filing. The following are some comments regarding the analysis prepared as it relates to the Limited Project status:

24179

Sudbury Conservation Commission

November 14, 2011

RE: MassDEP File No. 301-1068 NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 5

- a) The analysis looked at abutting properties for alternative means of access to avoid or reduce wetland impacts related to the main stream crossing. The only routes with any possibility related to access from Cutler Farm Road. However, no feasible routes were found that would be available through abutting properties due to various logistics and cost. There is also a blanket statement that Cutler Farm Road would not be suitable for access for this project, as it was not designed to handle the traffic that would be associated with this development. The analysis also looked at alternatives for bridging the wetlands to reduce impacts, which was determined by the Applicant to be cost prohibitive.

#### COMMENTS

- The use of Cutler Farm Road for access may or may not be a workable solution for the project, but there is no supporting information provided relative to the design traffic capacity, other unacceptable neighborhood impacts, acceptability to the Planning Board, etc. on which to evaluate this.
  - The use of the property at 175 Landham Road (Donovan Property) off the southeast portion of the site was not investigated. That property has access to Cutler Farm Road via a paper street. An access route appears feasible that would be of similar length to the proposed crossing, but would only require a short crossing of a small intermittent stream rather than the long crossing of the perennial stream. The route would require some alteration of the outer Riverfront, which would be significantly less intrusive than the alterations proposed for the direct crossing of the perennial stream. To be complete, this alternative should be investigated.
  - Note that I am not advocating for any particular alternative, only a thorough evaluation given the large amount of wetlands resource area alterations being proposed.
- b) The Analysis looked at several different development schemes for the property including a large condo development, two single family residential subdivisions, a 2 lot ANR for single family houses with no wetland alterations, an apartment building scheme with 24 units with no wetlands alterations at the front of the property, and a minor alteration of the current project plan that eliminates the smaller intermittent stream crossing.



24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 6

COMMENTS

- The 2 lot ANR Plan, the 24 unit multi-Family Housing plan, and the front portion of the 13 Lot Subdivision Plan consisting of 4 lots all could be developed with no need to cross the perennial stream and would substantially reduce or eliminate the wetland resource area alterations. The 24-unit multi-family apartment building alternative appears that it would serve the same purpose of developing rental apartment housing. It also appears that the latter development scheme could possibly be significantly expanded from what is shown and require only minor intrusions into the Riverfront Area that could be designed to meet the General Performance Standards of the Riverfront Regulations 10.58. Further investigation of this latter alternative appears warranted.
  
- In the assessment of the alternative of the 24 unit Multi-Family housing project the applicant states *"This alternative keeps all of the work outside of areas subject to the Wetlands Protection Act. However, leaving the substantial westerly upland area comprising 18 acres of the site undeveloped is not a reasonable alternative to provide access to this area controlled by the applicant as contemplated by 310 CMR 10.53(3) and the Mass. DEP Wetland Policy...."* (Underline added). The underlined portion of the statement appears to be a significant portion of the issue of whether this project qualifies as a Limited Project. The letters provided by Attorney Witten provides a contrary opinion as to what was contemplated by 10.53(3). I recommend that the Commission request additional information such as past rulings from DEP or other regulatory guidance supporting the Applicant's contention on this subject.

**3. BVW Mitigation - Wetland Replication Area (WRA)**

According to the filing documents, the project will permanently alter 10,485 SF of Bordering Vegetated Wetland. As mitigation, the construction of a 21,000 SF Wetland Replication Area is proposed. Note that the following evaluation is based on the assumption that the project is found to qualify as a Limited Project under 10.53(3)(e). If the project is found to not qualify under that section, the project as designed cannot meet the general performance standard under 10.55(4) and cannot be approved.

Per 10.53(3)(e) "The applicant shall provide replication of bordering vegetated Wetlands and compensatory flood storage to the extent practicable". The applicant

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 7

is proposing to comply with this by a replication of twice the area the BVW to be lost. The 2:1 replication area is proposed to comply with the Sudbury Wetlands Administration Bylaw Regulations. The Replication Area is generally being designed per the applicable DEP Standards with several important exceptions that, in my opinion, make this design not in conformance with the WPA Regulations and standards. These are as follows:

- a) The proposed WRA is being located between two BVW areas that are at different elevations. The wetland bordering on the perennial stream is to the east of the WRA, and a BVW to the west is at a higher elevation. I have no doubt that the area would become a wetland, however, the plan calls for a 2 foot cut directly adjacent to the westerly wetland. Given the sandy nature of the soils, this will lower the water table at the wetland to the west, which in effect will change the hydrology of that wetland. It would likely change a portion of that area to upland by lowering the water table. This likely impact to the adjacent wetland needs to be addressed, and perhaps a more suitable location found. If the WRA shown is to be reconfigured or modified in the same general location, extensive soil testing in the area would be necessary to define the maximum seasonal groundwater elevations throughout the replication area so that the replication area can be designed to not alter the hydrologic conditions that are supporting the westerly wetland.
- b) The WRA does not address the loss of flood storage at the wetland crossing. By the Engineers calculations contained in the Stormwater Report, the 100-year flood elevation on the upstream side of the cart road is 124.3 ft. This elevation is entirely within the BVW so there is no Bordering Land Subject To Flooding under the WPA, however this adds a value of flood storage to the BVW that must be addressed. (WPA Regs 10.55(4)(b)7.) and per 10.53(3)(e)). In order to provide compensating flood storage, at least a portion of the WRA would need to be upstream of the culvert. Calculations as to the flood storage being lost and compensating flood storage are required.
- c) The proposed wetland being filled is presently a mix of shrub swamp and wet meadow. The plantings being proposed appear to be attempting to create a wooded swamp.

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Page 8

- d) The plan for the replication is a narrative type. An actual planting plan is recommended for the final plan.
- e) The calculation of the 10,485 SF of permanent BVW alteration appears to be based on the area between the limits of the exterior of the retaining walls. During construction, there will also be alteration of BVW outside of the retaining walls for excavation of footings, installation of erosion controls, etc. The computation of the area must include the total alteration and the plans must include information relative to the restoration of that wetland outside the walls in place.

#### 4. Riverfront Area Performance Standards

For reference, the General Performance Standards are at 10.58(4). The "Wetlands Permitting Summary" contained in the Notice of Intent package contends, "*that the project satisfies the regulatory performance standards for work in the Riverfront Area.*" I disagree with this conclusion for the following reasons:

- a) Protection of Other Resource Areas 10.58(4)(a): This section requires the that the "work shall meet the performance standards of all other resource area within the Riverfront Area,...." Presuming that the project qualifies as a "Limited Project" the regulations require replication of the BVW and compensatory flood storage. As described above, the project as designed does not meet that standard. If the project does not qualify as a "Limited Project", the project does not meet the General Performance Standards for BVW, so again, this project could not be allowed.
- b) Protection of Rare Species - 10.58(4)(b): Not applicable.
- c) Practicable and Substantially Equivalent Economic Alternatives - 10.58(4)(c):  
I disagree that the applicant has submitted an Alternatives Analysis sufficient to demonstrate that there are "no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. Ch. 131 s.40". The reasons include the following:

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 9

- The discussion relative to the Alternatives Analysis, items a) and b) under the Limited Project qualification section earlier in this report is directly applicable to this item. Those sections detail how the Alternatives Analysis performed is not sufficient to meet this standard in two significant areas.
- In addition to the alteration relative to the Limited Project Crossing, the project includes alterations of Riverfront Area including the entirety of Building #10, a portion of Building #5, an "Office Building" for the complex, parking facilities, and related clearing, grading and landscaping. Due to the extensive wetland resource area alterations proposed for the crossing, it would be very important to provide a more thorough evaluation of alternatives to reduce the wetland resource area impacts including Riverfront. Obvious examples to name a few would include:
  - 1) Can the project be reduced to "Avoid" the intrusions into the Riverfront beyond that for the crossing by eliminating the project components identified above?
  - 2) Can the development be consolidated into a smaller number of taller buildings with consolidation of parking and perhaps multi story parking garages to reduce the footprint of the development?
  - 3) Could some of the units be placed at the front of the site in multi-story buildings, reducing the number in the central portion of the site to avoid the additional Riverfront impacts?
  - 4) Could the Office be included in one of the buildings?

Again, I am not advocating for any particular alternative, only a thorough evaluation given the large amount of wetlands resource area alterations being proposed.

The above are only relevant if the project is found to qualify as a Limited Project. If it does not qualify, the above are moot, as the project cannot meet the General Performance Standards of the Riverfront Regulations.

d) No Significant Adverse Impact 10.58(4)(d):

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Page 10

The Riverfront Area Performance Standards section contained on page 16 of the "Wetland Permitting Summary" states that *"In addition, the project, including the "Limited Project" roadway impacts, affects less than 10% of the Riverfront Area of the site, and thereby complies with the "no significant adverse impact" provision of 310 CMR 10.58(4)(d). Therefore, it is Eco Tec's opinion that the proposed project satisfies the regulatory performance standards for work in Riverfront Area."* Underline added.

I disagree with this conclusion. This project ignores compliance with the provisions of 10.58(4)(d)1.a. That section severely limits work within the 100-foot inner riparian zone, which this project does not meet. This project may be allowed through qualification as a Limited Project, but cannot be approved without that qualification, as it would not meet this General Performance Standard.

#### **5. Bank Performance Standards 10.54(4)(a) Wetland Crossing Culverts**

As part of the Mitigation for the wetland crossings, the Applicant has proposed providing culverts that meet the Mass. Stream Crossing Standards. If there is going to be crossings of the streams on the project, I concur that they should be designed to meet those standards at a minimum. Bridging for the perennial stream crossing has been considered by the applicant and ruled out as too costly. I would concur that the two bridge scenarios analyzed would be cost prohibitive. (This is further discussed below.)

It is my opinion that meeting the Stream Crossing Standards is feasible at the site. It is also my opinion that this is required in this case to meet the performance standards in this section as well as requirements of the Mass. Water Quality Certification Regulations and the Army Corp standards, both of which will apply to this project. However, I have several issues with the culvert design proposed as follows:

- a) No computations have been submitted supporting that the culverts as designed meet the standards. (Openness Ratio, etc.)
- b) The main stream crossing culvert as designed will lower the flood elevation of the area upstream of the culvert by the Engineers own

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 11

calculations. This needs to be considered and addressed relative to the impacts to the upstream and downstream wetland.

- c) The design detail and the information contained in the "Bank Restoration Protocol" section of the Wetland Permitting Summary provided do not show the information needed to replicate the natural stream channel to meet the Stream Crossing Standards. There are good examples of the natural stream channel upstream and downstream of the culvert on which to base the design.
- d) The channel will be focusing stream flow at one point rather than a broad overtopping of the cart road as the engineers calculations predict. The engineer needs to look a velocities through the culvert and design the channel section for stability accordingly while meeting the wildlife aspects.

The bridging idea as analyzed rules out a very log span. I would, however suggest that the installation of a shorter bridge crossing may have advantages over a span of 12 feet afforded by the culver crossing proposed in being able to replicate the stream section and provide flood overtopping to replicate the flood control aspect of the crossing. Given the scope of the project, I believe the culvert may be designed to work to meet the standard, but I would recommend the Applicant consider a short bridge.

#### **6. Land Under Water Bodies and Waterways Performance Standards** **10.56(4)(a) Wetland Crossing Culverts**

The perennial stream being altered contains this resource area. This is not mentioned in the Notice of Intent. This needs to be corrected on the NOI form and the compliance with this resource area addressed for completeness of the filing.

Generally the performance standards of this section will be addressed by the culvert or bridge being properly designed in accordance with the Stream Crossing Standards as discussed above.

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** NOI Initial Review  
Johnson Farm – 189 Landham Road, Sudbury, MA

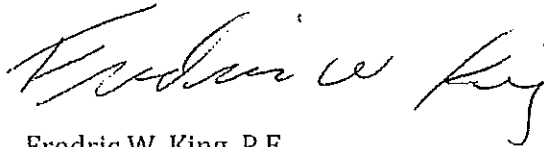
Page 12

**7. Stormwater Management 10.05(6)(k)**

The review of compliance with the Mass. Stormwater Management Regulations and Handbook is included in a separate report.

If you have any questions regarding this report, or would like me to look at any other aspect of the WPA Regulations that have not been covered, please feel free to contact me.

Sincerely,



Fredric W. King, P.E.  
Senior Project Manager  
Senior Wetland Specialist.

CC: Deborah Dineen (and for further distribution)



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24179

Sudbury Conservation Commission  
275 Old Lancaster Road  
Sudbury, MA 01776

November 14, 2011

RE: **MassDEP File No. 301-1068** Stormwater Management - Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Dear Commission Members:

This report contains the findings of my initial review of the Stormwater Management Plan and Site Plans prepared by Tetra Tech as part of the Notice of Intent under the Mass. Wetlands Protection Act filed by Robert Moss of Madison Place Sudbury LLC (Applicant). The proposed project is a residential apartment development at the subject site. This review has been performed per our contract/proposal dated October 12, 2011.

This report is relative to the project compliance with the Mass. Stormwater Management Regulations per 310 CMR 10.05(6)(k) and the MassDEP Stormwater Management Standards Handbook and with general good engineering practice. Our findings are based on the following submitted documents, plans and information:

- Attendance at the Wetlands Protection Act hearing on October 24, 2011.
- A site visit on October 28, 2011.
- Review of the filed plans and documents including but not limited to:
  1. Notice of Intent and attached documents contained in the NOI booklet (October 4, 2011)
  2. Site Development Plans entitled "Comprehensive Permit Preliminary - Site Development Plans, The Residences at Johnson Farm...." (as updated 10/4/11) containing 20 sheets.
  3. Landscape Plans prepared by Sudbury Design Group dated 8/5/11 (6 sheets).
  4. "Stormwater Management Plan, The Residences at Johnson Farm...." Dated October 4, 2011 prepared by Tetra Tech.
  5. Letter from Tetra Tech dated October 17, 2011 containing "Supplemental Stormwater Information".
  6. Supplemental Information provided by Tetra Tech dated November 7, 2011 relative to Porous Pavement.
  
- As additional background information and a more complete understanding of the project, the Comprehensive Permit Application filed with the Zoning Board of Appeals for the project dated August 8, 2011 under MGL Ch. 40B was also reviewed.

24179  
Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068 Stormwater Management - Initial Review**  
Johnson Farm - 189 Landham Road, Sudbury, MA

Page 2

- For additional information on porous pavement, we reviewed the available information on the UNH Website.

### **1. Submittal Documents - General Content**

The Stormwater Management Plan for the project and the Site Plans generally contains the required materials per the Mass. Stormwater Management Regulations and as prescribed in the DEP Stormwater Management Handbook. The materials are generally sufficient to describe the intent of the stormwater design and determine whether the project as designed complies with the requirements with certain exceptions that are outlined in this report.

It is noted that the Site Plans are "Preliminary" and of the nature intended for permitting. As such, they lack certain detailed information necessary for construction. In some areas additional detail is necessary for a complete understanding of the Intent, errors are found, or questions are raised requiring further explanation. Those judged by this reviewer as important for this evaluation are pointed out in this report for correction, additional information or other response from the applicants engineer as necessary.

### **2. Erosion and Sediment Control - Stormwater Pollution Prevention Plan**

The Notice of Intent documents and the narrative of the Stormwater Management Report 1.0 and 3.8 state that a SWPPP was prepared by Eco Tec and submitted with the NOI. SBNE did not receive a copy of the SWPPP for review. The Stormwater Checklist contained in Appendix A indicates that the SWPPP has not been prepared and that the SWPPP will be prepared before any land disturbance.

Note that for a project of this complexity, the preparation of a SWPPP is not strictly required by the Regulations. The Erosion and Sediment Control Plan submitted shows the requirements for Erosion and Sediment Control in a general manner, which is common for this type of filing. With a project of this complexity, it is important that the actual contractor that will be doing the work be involved in the development of the SWPPP. The SWPPP is also time sensitive. A project that begins site work in April will need to be managed much differently than one beginning August.

#### **Comments and Recommendations:**

- a. Due to the very close proximity to wetlands of all the work, the working space is extremely tight. Also, it will be imperative that the work be done in

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068** Stormwater Management - Initial Review

Johnson Farm – 189 Landham Road, Sudbury, MA

Page 3

such a manner to protect the porous pavement bed and underlying soil from over compaction and contamination with fine silt that could seriously affect its performance. The project, therefore, needs to be carefully sequenced. Opening up the entire site and attempting to construct the whole site in one construction operation with all buildings being constructed at one time (although not impossible) is not recommended.

- b. Crossing of the wetland will require significant excavation of wet soils and dewatering in close boundaries. This work should take place during the driest time of year and this operation needs to be carefully planned and detailed.
- c. Per the Construction Sequence included in the Stormwater Report, the porous pavement base and paving is done at the end of Phase 4, prior to finish grading, landscaping and stabilization of the roadsides and adjacent areas that are to be done in Phase 5. This finish work in tight working space will be difficult to control the tracking of mud onto the pavement. It is recommended that as much of the roadside area, stormwater basins, etc., as possible be finished graded and stabilize before the installation of the base and pavement. This would leave only the road edges and planting left to be completed.
- d. Given the tight working conditions in close proximity to the wetlands, the preparation of a SWPPP of the complexity required should not be left to the last minute before construction. This should also be reviewed and approved by the Conservation Commission and other permitting agencies well in advance of construction. If the project is approved, I recommend a condition be placed in the Order requiring submittal of the SWPPP with sufficient time allowed for review and approval. In the meantime, I would recommend that a preliminary SWPPP be prepared that contains the basic requirements per the NPDES Construction General Permit to be utilized as a basic framework for the later complete SWPPP.
- e. Given the earthwork required, the small stockpile areas shown on the plan would not be adequate unless the project is constructed in multiple pieces so that only small areas are worked at any given time.

### 3. Porous Pavement

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068 Stormwater Management - Initial Review**

Johnson Farm - 189 Landham Road, Sudbury, MA

Page 4

The stormwater management system relies primarily on porous pavement systems for water quality treatment, control of peak rates of runoff, volume/recharge control and general compliance the Mass. Stormwater Management Regulations. This stormwater management technique is gaining acceptance as a stormwater BMP and is a recognized LID technique. The use of this BMP to this extent for a project is still quite rare, but examples do exist and there is substantial study and design information available, particularly through the University of New Hampshire. The MassDEP Stormwater Handbook contains guidance on the design and use of porous pavement, much of which utilizes the information developed at UNH, and recommends using the information from that source and a few others.

In general, the engineers have designed the systems following the design recommendations and specifications developed by UNH. In my review of the plans and documents, I did note several possible problem areas and have some questions and comments relative to the design and calculations for the design engineers as follows:

- a. The engineer uses an "extended time of concentration" of 481 minutes to model the time for the subcatchment runoff to reach the pavement storage reservoir. If you assume 5 minutes of the  $T_c$  to be the time to reach the pavement, the infiltration time for runoff to reach the storage layer translates to approximately 3.9 inches per hour. Given the materials in the pavement and base section, this rate seems somewhat slow. The report states that this rate is based on data produced by UNH. Some additional information on that should be provided.
- b. In the porous pavement information contained in the MassDEP Stormwater Handbook, it states that the "storage reservoir must be completely flat so that runoff can infiltrate through the entire surface". The model of the porous pavement ponds also indicates this is being done for each section of porous pavement. The plans, however, do not indicate the bottom elevation of each particular section of reservoir. They only indicate that the bottom is 31 inches below the pavement surface, which would mean that the reservoir slopes with the surface grade. The example cross sections contained in the October 17, 2001 Supplemental Stormwater Information provided by Tetra Tech indicate the reservoir base grade follows the surface slope. If that is the case, then the computer model of the reservoir would not be correct. Additional information indicating the reservoir elevations need to be shown

24179

Sudbury Conservation Commission

November 14, 2011

RE: MassDEP File No. 301-1068 Stormwater Management - Initial Review

Johnson Farm – 189 Landham Road, Sudbury, MA

Page 5

on the plan and should be designed as flat for each section. Alternatively, additional information is necessary as to why the reservoir need not be flat and why it is appropriate to model the reservoir as if it were flat.

- c. Each section of reservoir is at a different elevation with no physical separation between sections. What stops stored water from moving from a higher reservoir to an adjacent one with a lower elevation?
- d. In a couple of areas, separation to groundwater is less than indicated on the plans.
  - One is at the location of the Typical Pavement Section in Figure S-1 of the October 17, 2011 Tetra Tech letter. The Section indicates a groundwater elevation of 124.5, which is the elevation, determined at the test holes on the northwest side of that section. However, there is an isolated wetland at Building 6 at elevation 127 and the wetland directly behind Building 6 is at between 127 and 126.4. Will this have any implications as to the concept?
  - The other location is at the area near Building 4 where the water table on the north side of the road is at 127.4 and on the south side of the road, the wetland nearby is at 130.4. This would place the reservoir for that section less than 2 feet above the water table and may not provide the minimum 2 foot separation to groundwater required. The engineer should look at that section to see if any adjustments are necessary.
- e. It is clear how the systems are supposed to work at the typical sections where there is ample distance between the storage reservoir and the surrounding natural landscape elevations. However, additional explanation as to how the porous pavement system works in the area of the three culvert crossings should be provided. The MassDEP recommends a 20-foot setback to foundations walls. At these sections, the reservoir is designed to be about 5 feet from the walls and well above the adjacent wetland terrain. It is my understanding from the Engineer's presentation at the last hearing that the wall will be a segmental block type of wall. What prevents the runoff exfiltrating from the reservoir from following the path of least resistance and short circuit out through the wall, or from following the exterior of the culvert through the wall and acting as a direct discharge point?

24179  
Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068 Stormwater Management - Initial Review**  
Johnson Farm – 189 Landham Road, Sudbury, MA

Page 6

- f. For the 6-inch subdrain to work as modeled in the hydrologic calculations, the orifice holes must be on the top of the pipe, or the invert needs to be 6 inches off the bottom of the storage reservoirs. This information needs to be added to the plans.

#### **4. Outlet Ponding Areas (Rain Gardens)**

The outlet ponding areas are designed to receive runoff from the buildings and the surrounding landscape, provide an overflow outlet from the porous pavement storage reservoirs, and allow water from the building runoff to utilize the pavement reservoir for infiltration so the systems act together for the intended function. I do not have any issue with this concept. I do have the following comments on a couple of points:

- a. The plans lack any detail on the design of these basins. The written Stormwater report describes the intent. The detail of these needs to be placed on the plans. Of particular concern is the overflow spillway. Per the plan, it looks like the basin would simply overtop the vegetated bank as a "level spreader". In reality, this would not occur and the flow would find a low point on the bank and would likely erode the bank. Dimensions are contained in the hydrologic model as to the width of the level spreader. An actual level spreader with a stabilized embankment to bring the overflow to the natural terrain at the wetland should be provided.
- b. The ponding area to the east of Building 4 is below the level of the adjacent wetland and may be below the water table. The engineer should look at this to see if there is an issue, as the bottom may not drain properly.

#### **5. Long Term Pollution Prevention Plan (LTPPP)**

The LTPPP includes the basic requirements for the maintenance of the stormwater systems. Given the importance of the proper maintenance of the stormwater system, including the porous pavement, it is recommended that this basic information be built into a detailed maintenance manual for use by the manager of the site. The manual would provide information on specific items to note on inspections of each bmp, what problems to watch out for, etc. There would need to

24179  
Sudbury Conservation Commission

November 14, 2011

RE: MassDEP File No. 301-1068 Stormwater Management - Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Page 7

be more specific information on exactly what maintenance is required for the rain gardens (such as not allowing trees to grow on the berms, vegetation management, depth of accumulated sediment that would trigger removal, etc. It is also recommended that a more rigorous inspection and monitoring schedule be required for the first few years of operation on which to base adjustments to the maintenance program to reflect the actual maintenance required for the site specific conditions.

Maintenance of the porous pavement is critical for this facility. The written documentation is not consistent on the number of times that cleaning is required. In one place the document states bi-annual, in others it states quarterly, in others it states quarterly up to monthly as necessary. The actual program needs to be made explicitly clear, and what inspections should be looking for to trigger requiring cleaning.

The spill of oil or toxic material onto the porous pavement would need special treatment that responders should be notified of. For example, you cannot hose off the surface and collect the water for removal. The contaminated pavement and portions of the base may need to be removed. The actual procedures need to be clearly spelled out.

## 6. Hydrologic Model and Calculations

This review is based on the Stormwater Management Report and Plans as dated October 4, 2011. It is our understanding that the Engineer is in the process of revising the calculations regarding the off-site watershed so my comments will be regarding the on-site portions of the stormwater model. The following are my findings based on the October 4, 2011 information:

### a. Existing Conditions Model

- The existing culvert at the cart road at the perennial stream was measured in the field by SBNE during the site visit as a 31" x 50 inch CM pipe arch. This is likely a standard 32 X 49 pipe that is slightly depressed in place. The dimensions used in the model are 32.4" x 53.8", which is not far off, but the model assumes a box culvert rather than a pipe arch. The model did not indicate any correction factor applied to adjust the capacity. Was one applied? If not, the model needs to be adjusted.

24179

Sudbury Conservation Commission

November 14, 2011

RE: **MassDEP File No. 301-1068 Stormwater Management - Initial Review**

Johnson Farm - 189 Landham Road, Sudbury, MA

Page 8

- The pond model of the area upstream of the culvert does not include any storage and the overtopping of the cart road is not considered on the model. This should be included to properly model the flood elevation on the upstream side of the cart road and the discharge to the downstream area.
  - The discharge from the culvert is directly added to the Design Point DP-1. This flow should be routed through the stream reach. Per the Tc calculations for Subcatchment 1-B, the travel time for that reach is 13 minutes, so it may be significant.
  - Rainfall Depths used for the calculations are from the Sudbury Stormwater Bylaw. These are larger than the TP-40 data but I have no objection to using these larger rainfall depths.
- b. Proposed Conditions Model
- There appears to be an error in the model regarding the routing of Subcatchment 2-D. The proposed conditions model shows that subcatchment flowing west through the proposed culvert as part of the watershed to DP-2. The existing conditions model shows that area draining to the east as part of the watershed to DP-1. Based on the Topo information available, the Existing Conditions model appears to be correct.
  - The proposed box culvert at the perennial stream (modeled as Pond 1P) is modeled as a clean 12' x 4' box culvert with an n value of 0.013. This does not take into consideration the construction of the streambed in the culvert. It is also noted that the culvert would significantly lower the flood elevation of the upstream wetland. See the comments made in the separate SBNE Wetlands review report also dated 11/14/11 for additional information on the stream crossing standards.
  - Discharge from Pond 1P above is also added directly to the Design Point 1 reach. As with the existing conditions, this should be routed through the stream reach.
  - The Pond 1P is also modeled with no flood storage considered. This is necessary for the evaluation of wetland impacts and a better representation of downstream discharges
  - The discharges from the smaller ponding areas around the site are also added directly to the main design points DP-1 and DP-2. In my opinion, this would be an allowable conservative simplification, as flood routing all these small discharges through reaches to the design point would most



24179  
Sudbury Conservation Commission

November 14, 2011

RE: MassDEP File No. 301-1068 Stormwater Management - Initial Review  
Johnson Farm - 189 Landham Road, Sudbury, MA

Page 9

likely result in lower proposed conditions flows than the model predicts as presently configured.

- The exfiltration rate from the porous pavement storage reservoir is set at 0.27 inches per hour, which is the infiltration rate of a silt loam. Based on the profile of the pavement sections, it is my opinion that this is conservative in most cases around the site and is appropriate.
- See the related comments above in this report relative to the Porous Pavement design, responses to which may affect the model.

It is noted that stormwater issues are also being reviewed separately for the Sudbury Zoning Board of Appeals by Hancock Associates under the Comprehensive Permit Filing presently underway. The Commission should also consider that review when it is available.

If you have any questions regarding this report, or would like me to look closer at any other aspect related to Stormwater that have not been covered, please feel free to contact me.

Sincerely,



Fredric W. King, P.E.  
Senior Project Manager  
Senior Wetland Specialist.

CC: Deborah Dineen (and for further distribution)